REMARKS

With the above amendments, claims 1-5, 8, 22-25, and 33-38 remain in the application. Claims 6, 7, 9-21, and 26-32 have been canceled in this response, while claims 33-38 have been added.

Substance of Examiner Interview

On April 4, 2006, the Examiner and the undersigned had a telephonic interview to discuss all of the pending claims in light of the Pearson, Kastanis, Gung, and the Lai patents. The Applicants and undersigned sincerely thank the Examiner for granting the interview.

The undersigned explained to the Examiner that with the exception of Lai, the references of record do not teach or suggest formation and use of separatrices. While Lai discloses the formation and use of a separatrix to control deposition of thin films onto a substrate, Lai does not disclose the formation and use of a separatrix to form an open plasma loop. Furthermore, Lai does not disclose confining of one separatrix within another separatrix. The Examiner agreed and suggested amending the pending claims to specifically recite features of the invention that employ a separatrix.

Claim Rejections -- 35 U.S.C. § 102

Claims 22, 23, and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,432,285 to Kastanis et al. ("Kastanis").

Claim 22 is patentable over Kastanis at least for reciting "confining the first separatrix within a second separatrix, the first separatrix and the second separatrix each comprising a surface having a null region through which ions may escape through." Kastanis discloses a magnet assembly for a magnetron sputtering apparatus and formation of closed loop plasmas. However, Kastanis does not teach or suggest

formation of a separatrix or null regions through which ions may escape through, let alone a stack of separatrices with one being confined by another. Therefore, it is respectfully submitted that claim 22 is patentable over Kastanis.

Claims 23 and 25 depend on claim 22, and are thus patentable over Kastanis at least for the same reasons that claim 22 is patentable.

Claim Rejections -- 35 U.S.C. § 103

Claims 1-4 and 8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,132,576 to Pearson ("Pearson").

Claim 1 is patentable over Pearson at least for reciting: "forming an open plasma loop by forming a separatrix such that a portion of the open plasma loop enclosed by the separatrix is cut-off by a target of a magnetron apparatus, the separatrix comprising a surface having a null region through which ions may pass through." Pearson discloses a configurable magnetic plate. Pearson teaches that the magnetic plate may be rotated to form different plasma zones. However, Pearson does not teach or suggest formation of an open plasma loop within a closed plasma loop, nor its attendant benefits. To expedite prosecution, claim 1 has been amended to recite that the open plasma loop is formed by forming a separatrix such that a portion of the open plasma loop is cut-off by the target This is supported at least in FIG. 10B of the specification, which is reproduced below for the convenience of the Examiner.

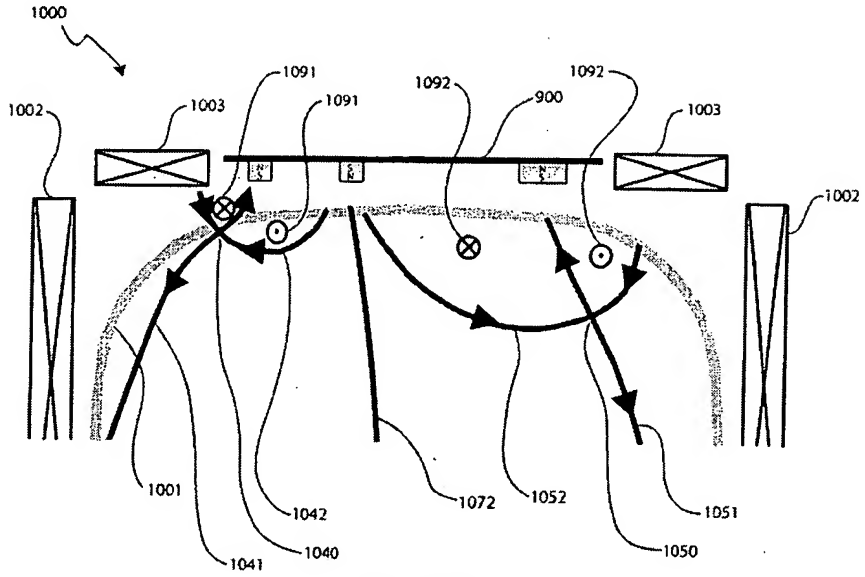

FIG. 10B

In the example of FIG. 10B, the separatrix 1042 confines a plasma loop 1091, which is cut off by the target 1001. This results in plasma loop 1091 being an open plasma loop (Specification, page 11, lines 9-15.).

It is respectfully that Pearson does not disclose formation and use of a separatrix, let alone formation of a separatrix as recited in claim 1. Therefore, it is respectfully submitted that claim 1 is patentable over Pearson.

Claims 2-4 and 8 depend on claim 1, and are thus patentable over Pearson at least for the same reasons that claim 1 is patentable.

Claims 1 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pearson in view of U.S. Patent No. 6,179,973,

As discussed above, Pearson does not teach or suggest formation and use of a separatrix. Lai teaches the use of a separatrix and control of separatrix at a mouth of a hollow cathode magnetron to control ion flow to the substrate. However, Lai is silent as to formation of open loop plasmas using a separatrix. More specifically, Lai does not disclose formation of a separatrix such that a portion of the open loop plasma enclosed by the separatrix is cut-off by the target. Therefore, it is respectfully submitted that claim 1 is patentable over Lai and Pearson.

Claim 5 depends on claim 1, and is thus patentable over Pearson and Lai at least for the same reason that claim 1 is patentable.

New claim 33 is similarly patentable over Pearson and Lai at least for reciting: "wherein the open plasma loop is formed by physically blocking a return path of a separatrix comprising a surface having a null field region through which ions may pass through."

Claims 22 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kastanis in view of Lai.

Claim 22 is patentable over Kastanis and Lai at least for reciting a first separatrix confined within a second separatrix. As explained above Kastanis does not teach or suggest formation and use of separatrix. While Lai teaches the use of a single separatrix to control flow of ions to a substrate at a mouth of a hollow cathode magnetron (see Lai, FIG. 1, separatrix with null region 107), Lai does not teach or suggest confining a first separatrix within a second separatrix as recited in claim 22. Lai FIG. 1 is reproduced below for ease of discussion.

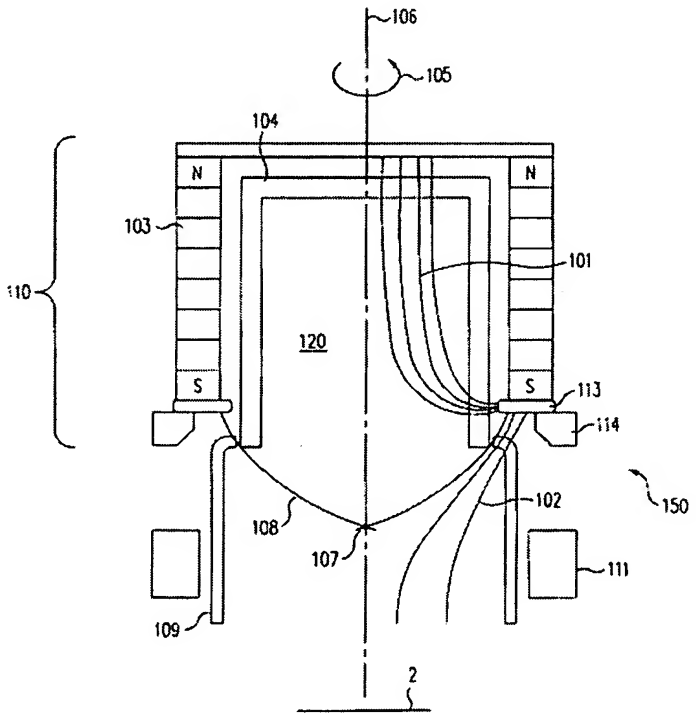

FIG. 1

In Lai FIG. 1, a separatrix includes the field line 108, which has a null region 107. Ions confined within the cathode 110 escapes through the null region 107 and get deposited on a substrate 2. Lai teaches that current through coil 111 may be adjusted to adjust the separatrix to spread or focus ions escaping from the cathode 110. Lai, however, does not teach or suggest confining one separatrix within another, as recited in claim 22. In Lai, the separatrix that includes the null region 107 at the mouth of the cathode does not confine another separatrix.

Therefore, it is respectfully submitted that claim 22 is patentable over Kastanis and Lai.

Claim 24 depends on claim 22, and is thus patentable over Kastanis and Lai at least for the same reasons that claim 22 is patentable.

Conclusion

For at least the above reasons, it is believed that claims 1-5, 8, 22-25, and 33-38 are in condition for allowance. The Examiner is invited to telephone the undersigned at (408)436-2112 for any questions.

If for any reason an insufficient fee has been paid, the Commissioner is hereby authorized to charge the insufficiency to Deposit Account No. 50-2427.

Respectfully submitted,
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